United States
Nuclear Regulatory Commission

Attachment 8

Standards Development Organizations Licensing and Regulatory Approaches for Advanced Reactors

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Introduction

- Advanced Reactor Policy Statement
- Preapplication Review of Advanced Reactors
- Risk-Informed Regulatory Framework

Advanced Reactor Policy

- Updated Policy Statement (59 FR 35461) issued 07/12/94
- Expects as a minimum, the same degree of protection as current generation reactors.
- Expects enhanced margins of safety and/or utilization of simplified, inherent, passive designs to accomplish safety functions.
- Allows for innovative safety criteria (but requires consideration of LWR regulatory framework regarding D-I-D, Safety Goal, Severe Accident Policy, industry codes)

Generally less prescriptive more performance based.

Advanced Reactor Policy

Attributes that could support application:

- Reliable and less complex decay heat removal systems.
- Longer response time.
- Simplified safety systems that would reduce the need for complicated operator action.
- Reduce equipment subjected to severe environmental conditions.
- Designs that minimize the potential for severe accidents.
- Reliable balance of plant equipment.
- Easily maintainable equipment and components.
- Reduced potential for radiation exposure.
- Reference to existing technology or commitment to technology development program.
- Early Interaction with NRC (pre-application).

Pre-Application Review Objectives

- To develop guidance on the regulatory process, regulations framework and the technology-basis expectations for licensing an advanced design, including identifying and understanding significant technology, design, safety, licensing and policy issues that would need to be addressed.

- To develop a core infrastructure of analytical tools, contractor support, staff training and NRC staff expertise needed for NRC to fully achieve the capacity and the capability to review an advanced license application

- Provides valuable feedback to the applicant on safety, licensing, and policy issues.

- Provides a forum to seek input from all stakeholders.

Pre-Application Review Process

- Conduct Periodic Public Meetings with Applicant on Selected Topics:
- NRC Identifies Additional Information Following Topical Meetings
- Applicant Formally Documents and Submits Topical Information
- NRC Develops Preliminary Assessment and Drafts Documented Response
- Obtain Stakeholder Input and Comments at a Public Workshop
- Discuss Preliminary Assessments With ACRS and ACNW
- Commission Papers Provide Staff Positions and Recommend Policy Decisions
- Commission Provides Policy Guidance and Decisions
- NRC Staff Formally Responds to Applicant with Positions and Policy Decisions

RES Advanced Reactors Activities

- PBMR:
  - Plan developed (SECY-01-0070)
  - Pre-application work underway (FY2001-2002)
- GT-MHR
  - Request for pre-application interactions received from General Atomic
  - NRC Response
- IRIS
  - Developed under DOE-NERI program
  - Initial meeting on 05/07/01
- Generation IV
  - International activity coordinated by DOE
  - Longer term
  - NRC participating as an observer

Safety Significant Areas:

- Fuel Performance and Qualification
- High Temperature Material Issues
- Passive Design and Safety Characteristics
- Accident Source Term and Basis*
- Postulated Licensing Basis Events*
- Prototype Testing Scope and Regulatory Credit
- Containment Functional Design Basis*
- Emergency Planning Basis*
- Risk-Informed Regulatory Framework*
- Probabilistic Risk Assessment

* Commission Policy Decision Likely Is Needed

Risk-Informed Regulatory Framework

Need for NRC to establish an effective and efficient risk-informed, and where appropriate, performance-based licensing framework

Key Pieces Include:

- Design Basis Accidents, Systems Structures and Components
- Safety Enhancements
- Performance Requirements
- Treatment of Uncertainties
- General Design Criteria